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RAMSAY'S MANUAL OF BRITISH GEOLOGY

The Physical Geology and Geography of Great Britain: A Manual of British Geology. By A. C. Ramsay, LL.D., F.R.S., &c., Director-General of the Geological Surveys of the United Kingdom. Fifth Edition. (London: Edward Stanford, 1878.)

THIS well-known work has now reached its fifth edition, and has undergone such changes that it may be almost regarded as a new book. Not only has the quantity of matter in it been almost doubled since the last edition, and its bulk and price augmented in the same proportion, but its plan has been very greatly modified, as is indeed indicated by the second title now prefixed to it.

The original work was justly deserving of the very great success which it achieved. It consisted of a corrected report of one of the well-known series of lectures to working-men delivered by the author in his capacity of Professor of Geology in the Royal School of Mines, at the Museum in Jermyn Street; and it was a model of clear exposition of a branch of science by one who was a master of his subject, and who at the same time had acquired great experience and skill in presenting it to popular audiences. Probably no better introduction to the principles of geology could possibly be recommended to the English reader than this little book of Prof. Ramsay's.

We must confess to feeling that this complete re-modelling of the plan of a work that has already proved so successful, is a somewhat hazardous experiment. The original chapters of the book, which still retain the characteristics of popular lectures, do not always harmonise in style with the portions that were primarily intended for the pages of an encyclopædia. Indeed, as is admitted in the preface, the book now consists of two distinct works fused into one, and the reader is again and again reminded of the fact by somewhat awkward transitions and by abrupt changes in style and in the mode of treatment of the subject.

In almost every other respect we find the work to be worthy of the highest praise. The clearness and general accuracy of the information imparted by the book are as conspicuous in this as in the earlier editions, and Prof. Ramsay amply proves that he has not lost the most important gift which a teacher can possess, that of communicating his earnestness and enthusiasm to his readers. Many of the questions treated of at considerable length are of a somewhat controversial character, and the author has again and again to remark that he is teaching, not the universally accepted facts of the science, but the views which he himself has been led after long and careful study to adopt, and which he is sanguine enough to believe will be eventually accepted by all his brother geologists. Prof. Ramsay has certainly the merit of never being uncertain or hesitating in his convictions, and those who differ from, equally with those who coincide in opinion with him, will be glad to have the opportunity of reading his latest and most perfectly matured deliverances on questions in the discussions upon which he has long taken a

very prominent part. We are bound to say that in respect to these matters he writes with the most perfect candour, and is ever ready to admit that there are subjects in which the timidity or caution of other geologists does not permit them to follow him in his bold generalisations.

The space at our disposal will not permit of our entering into detail on the numerous interesting questions suggested by a perusal of this book. The author's attempts to picture to the mind of his readers the ancient physical geography of our portion of the globe during successive geological periods may be cited as among the most graphic pieces of writing, and at the same time the most valuable portions of the work. Here Prof. Ramsay is evidently entirely in his element; he writes with an enthusiasm which is perfectly contagious, and his arguments, if not always sufficient to carry conviction, are at all times worthy of serious consideration.

We cannot resist quoting Prof. Ramsay's latest views on the important and much-vexed question of the classification of the Cambrian and Silurian rocks. On this subject he remarks:—

"If these strata were to be classified for the first time in England, with my present knowledge, I would divide them into three, as the most convenient method. The first series would include the purple and green grits and slates of the Longwynd and Wales, and range upwards as high as the top of the Tremadoc slates; the second would range from the base of the Arenig slates to the top of the Bala or Caradoc beds; and the third from the base of the Upper Llandovery beds to the top of the Ludlow rocks."

It is true that after this statement, which is in such perfect harmony with the results arrived at by palæontologists in Bohemia, Scandinavia, America, and our own country, Prof. Ramsay announces his intention of still adopting the nomenclature of Murchison and the Geological Survey, which he admits to be "old-fashioned;" but he states that his reason for doing so is simply that this plan will be the most convenient for those who wish to consult the geological maps and sections published by the Government. As the date fixed for the completion of the Government Survey is now passed, we may perhaps hope that the Director-General will be able to devote his attention to the much-needed reform of that old-fashioned classification and nomenclature. At all events, every geologist will be gratified by learning from so high an authority that any difference which may now exist concerning the classification of the older palæozoic rocks is mainly one as to the employment of certain terms, and that on the actual facts of the case something like substantial agreement has at last been arrived at.

On another question, that of the date of the earliest traces of human workmanship in this country, Prof. Ramsay's remarks are certainly not calculated to give quite so much satisfaction to his readers. He writes:—"The antiquity of man being thus clearly established, it becomes obvious that his advent into our area was either of pre-glacial or of inter-glacial date. I say inter-glacial, because Mr. Skerthly has lately discovered palæolithic flint implements in certain brick-earths. Similar, and I believe identical, brick-earths underlie the 'chalky boulder-clay' in the neighbourhood, the boulder-clay having been removed by denudation from that

portion of the brick-earth in which the implements were found at Botany Bay, near Thetford, in Suffolk. The announcement at once provoked strenuous opposition, and therefore, on a tour of inspection of Mr. Skertchly's work with Mr. Bristow, we took care to examine into this point. The result was that I satisfied myself of the truth of Mr. Skertchly's observations that the implement bearing brick-earth in places underlies a boulder-clay, which, in his opinion, is not of the earliest date, in which case the men who made these tools must have been of inter glacial age."

The "strenuous opposition" to which Prof. Ramsay refers, was directed, it will be remembered, not against the possibility of human remains being found under glacial deposits, but against such a conclusion being accepted without the clearest and most irrefragable evidence being adduced in its support. And it must be borne in mind that a number of most competent observers have examined the sections in question, and have arrived at conclusions directly opposed to those announced by the officers of the Geological Survey. When, therefore, our author, still speaking of this question of the contemporaneity of man with the glacial epoch, goes on to exclaim: "Perhaps we cannot prove it, but there is nothing improbable in the hypothesis, and I am not the only one who believes it," we cannot help entertaining the feeling that this is hardly the spirit in which a scientific question should be treated, and that the method which he adopts is one scarcely calculated to carry conviction to the mind of any competent judge of the matter.

In laying down this book we cannot refrain from once more expressing our opinion that it is a work of the highest value, and one worthy to take a foremost place among popular manuals of science. The illustrations are excellent; the woodcuts, by Mr. Sharman—giving a very faithful representation of species which have been selected by Mr. Etheridge as characteristic of the several formations—are quite new, and some views of scenery have also been added to those contained in former editions of the book. The little geological map of Great Britain, which we are glad to see reproduced, is a marvel of clear and accurate printing in colours, and well sustains the reputation of the publishing firm which has produced it.

FLORAL DIAGRAMS

Blüthendiagramme. Construit und erläutert von Dr. A. W. Eichler, Professor der Botanik an der Universität Kiel. (Leipzig: W. Engelmann. Theil i., 1876, Theil ii., 1878.)

THIS book supplies a want that every real student of systematic botany must have felt. The introductory chapters are devoted to an inquiry into the morphology of the flower and its parts, and the inflorescence; while the subsequent chapters are a full exposition under the head of each family and order of the floral type and its most important modifications. Preceding each order is a list of the most important works bearing on it, and every quotation is accompanied by a full reference. Hence the book is both a Thesaurus of the literature of its subject, and moreover a Prodomus of phanerogamic morphology. Despite the modest title, the vegetative arrangements are explained wherever they present interest, and the same

ungrudging pains are often extended to fruit and seed. Unlike too many authors Prof. Eichler is utterly free from provincialism. He cites as freely and constantly foreign botanists as those who have used the German language. Unfortunately we are but poorly represented, for morphological research is all but unknown in England, and is untaught by both our swarms of botanical lecturers and the great institutions which are the outward and visible sign of what Government recognises as botany. The medical curriculum has overborne original teaching by the former, the herbarium has stunted all else in the latter. Hence few of our botanists are able, like an Eichler or a Baillon, to check observations on the adult flower, with its parts distorted by drying and soaking, by their own knowledge of the growth of the living plant. Even the greatest sagacity and experience must be at a loss sometimes from this weakness in the very foundations of their work. For this reason one regrets the more that Eichler makes not a single reference to the works of Griffith, perhaps the greatest botanical genius England ever possessed, who found out for himself the value of developmental research and worked out many a flower by its aid.

A word on the method of Eichler. The actual editor of the "*Flora Braziliensis*," he adds to his thorough knowledge of morphology proper a rare acquaintance with systematic botany. Hence he belongs to no school, though awake to the value of workers in more limited fields, in all of which he himself has done good service. A firm evolutionist, he accepts the testimony of systematist, anatomist, teratologist, organogenist, and histogenist, and believes that all of these can in turn shed light on doubtful points. Hence his opinion must be respectfully considered by those who differ from it, and it is worth while to note a few of his conclusions.

He regards the nature of the "calyx tube" as varying with the order; truly receptacular in Rosaceæ, for instance, it is, partly at least, appendicular in some cases. The petals of Primulaceæ are regarded as true petals, and not as appendages of the stamens, a view which our descendants will have forgotten or unearth with the lazy amusement with which we look on some of the naïf theories of our ancestors. The nature of the placenta and ovule is a more difficult question, and our author, who, in the preliminary chapters of Part i., published in 1876, held it essentially variable, has been led chiefly by Celanowsky's arguments to regard it as in all cases an outgrowth from the carpellary leaves. Similarly, the ovule, regarded in the First Part as a bud, is now viewed as an emergence. Of course the last word is not yet said on these points, but it is worth noting that Warming also avows his final conversion by Celakowsky, in his brilliant paper on the ovule in the first volume of the *Annales des Sciences Naturelles* for 1877; and Eichler is at one with Warming in adopting Brown's view of the female flower of Gymnosperms. It is much to be regretted that this point was not really discussed at the late congress in Paris, or that its principal advocates do not answer the latest arguments in its favour. But the question cannot at all be regarded as settled.

The cup of *Euphorbia* is regarded as an inflorescence; but though the *pros* and *cons* are fairly stated, no new light is shed on the matter.